

## Software Engineering Fundamentals - Tutorial

### Class and object diagrams

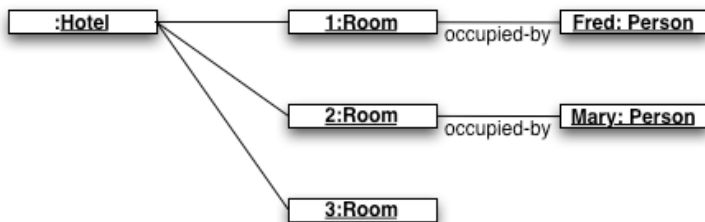
#### Q1

Draw a class diagram for the following problems. Include any appropriate attributes, and name the associations.

##### a)

A hotel has an address and multiple rooms that can be rented.

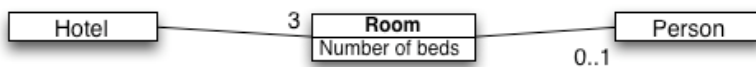
Draw an object diagram for small hotel with 3 rooms. Room 1 is currently rented to Fred, Room 2 to Mary. Room 3 remains unoccupied.



Draw the associated class diagram.



The multiplicity of Person can be \* (we don't specify an upper number of people in the room), or it might be 0..1 - we only allow one person in a room per night, or perhaps 0..2 if the room has a double bed. We could get extra fancy and specify for each room the number of people it can have and subclass room into different capacity rooms, but simpler just to include an extra field in room ("Max occupancy") and use this as a check against the number of people using the room (if we wish to record all the people using it).



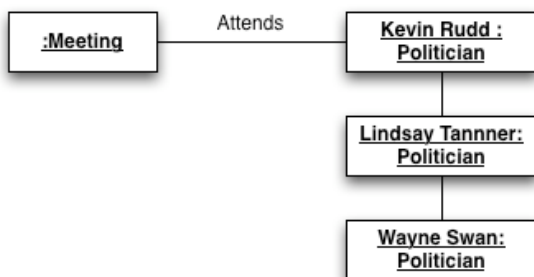
We may just want to record the person who books & pays for it.

#### Q2 Class diagram checks

Consider the following object and class diagrams and state if they are correct, and if not, where they are wrong.

##### a)

A meeting of politicians takes place in Canberra

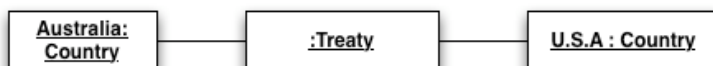


Invalid - there should be links between meeting and politician, not b/w politicians/

##### b)

Bilateral trade agreements exist between two countries.

##### i)



Valid

##### ii)



Invalid - A bilateral treaty can only be between two countries.

iii)



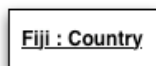
Valid - a country can have more than one treaty with another country

iv)



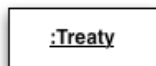
Valid - a country can have more than one treaty with different countries.

v)



Valid - a country can have no treaties

vi)



Invalid - a treaty must be associated with two countries.

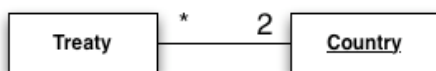
vii)



Invalid - a treaty must be associated with two countries.

viii)

Draw a class diagram for this problem.



## Q2 Use cases, object and class diagrams.

Galaxy Zoo (<http://www.galaxyzoo.org/>) is a project that organises volunteers to classify galaxies by examining photos from the Sloan Digital Sky Survey.

Once participants have an account they can analyse images of galaxies to determine if they are spiral or elliptical (the maximum by one person is over 50,000 objects!).

We'll assume that there is cross checking of the images, and only after they have been classified as one type or another by three participants are they accepted.

a)

What use cases can you identify?

Create account

Analyse image

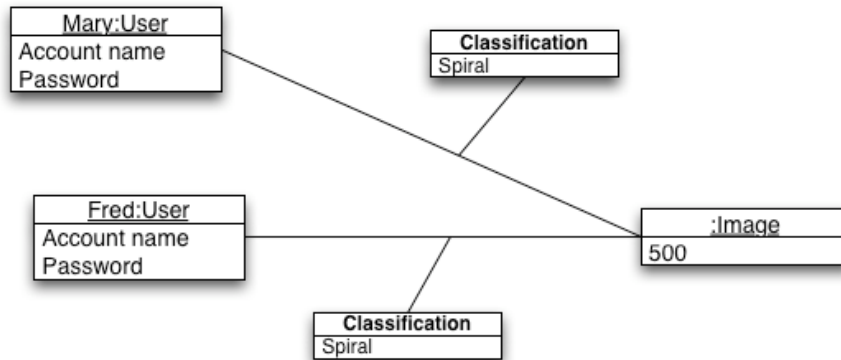
Get image to view

Accept image as classified - note this is done by the system.  
It might be triggered by an image being classified for the third time.

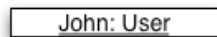
b)

Create object diagrams of...

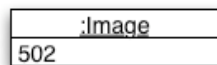
An image that has been classified by two people as spiral



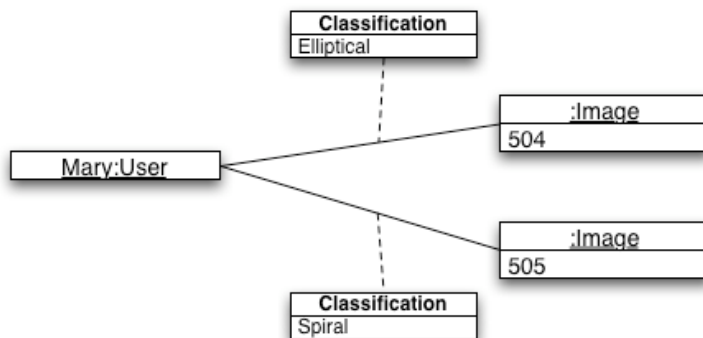
A user that hasn't classified any images yet.



An image that hasn't been classified by anyone.



A user that has classified two images, one as spiral and one as elliptical

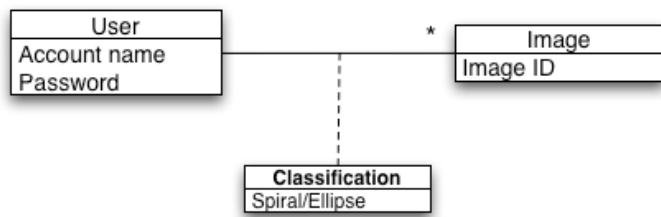


Three users that have classified a number of the same images.

...make up something.

c)

Create a class diagram for your problem.



Leave the existing object diagrams on the board, and draw this image to one side. You should get them to check that the diagrams match up.